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ECONOMÍA

TAXING BAD HABITS AND ITS EFFECTIVENESS

Módulo:
Economía del Sector Público

Pamplona-Iruña día de mes de año

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RESUMEN EJECUTIVO

La actual epidemia de la obesidad es una cuestión que cada vez gana más importancia en el sector público, ya que presenta una problemática no solo de salud sino también social y económica a nivel poblacional. La medida más reciente que ha implementado el gobierno de España dentro de su estrategia para combatirla ha sido una política fiscal en forma de subida del impuesto a las bebidas azucaradas. El presente informe realiza un análisis de esta para determinar su potencial efectividad. Teniendo en cuenta tanto las recomendaciones de las organizaciones internacionales de la salud como la experiencia previa de otros países y de Cataluña, se concluye que podría ser efectiva. Sin embargo, la actual medida necesitaría de ciertas mejoras para maximizar su efectividad. Los beneficios sociales y económicos que supondría la disminución de la obesidad son suficientemente relevantes como para apostar por ello.

Palabras clave: obesidad, política fiscal, impuesto, bebidas azucaradas, salud

ABSTRACT

The current obesity epidemic is an issue that keeps gaining importance in the public sector, since it presents an issue not only in health but also in social and economic terms at the population level. The most recent measure that the government of Spain has implemented within its strategy to tackle it has been a fiscal policy in the form of an increase in the tax rate on sugar-sweetened beverages (SSB). The present paper performs an analysis to determine its potential effectiveness. Taking into account both the recommendations of international health organizations and the previous experience of other countries and Catalonia, we conclude that it could be effective. However, the current measure would need certain improvements to maximize its effectiveness. The potential social and economic benefits resulting from reducing obesity are relevant enough to bet on it.

Keywords: obesity, fiscal policy, tax, sugar-sweetened beverages (SSB), health

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1. INTRODUCTION

Obesity has reached epidemic proportions worldwide, being often referred to as "globesity". According to the World Health Organization (WHO), today most of the world's population live in countries where overweight and obesity kill more people than underweight does. Each year, more than 2.8 million people die as a result of being overweight or obese. Between 1975 and 2016, the prevalence of obesity has nearly tripled. In 2016, 39% of adults aged 18 years and over worldwide were overweight (1.9 billion people), and 13% were obese (650 million people) (WHO, n.d.).

The situation of Spain regarding overweight and obesity is nowhere far from the world's average. In 2017, more than half of the adults in Spain (54.5%) were overweight or obese: 37.1% were overweight and 17.4%, obese. and the prevalence of obesity has multiplied by 2.4 in the last 30 years (Gobierno de España. Ministerio de Sanidad, Consumo y Bienestar Social, 2018). And not only adults are affected by this health issue, but also children are, given that the prevalence of overweight in 2019 was 23.3% and the prevalence of obesity, 17.3%, in schoolchildren aged 6 to 9 in (Gobierno de España. Ministerio de Consumo, 2020).

This issue has effects not only on several aspects of the life of the person in question, but also on the society as a whole. Thus, public policies must be put in place to tackle overweight and obesity. In the case of Spain, the government has recently chosen to include a tax on sweetened beverages within its global strategy towards minimizing obesity.

The present paper aims at analyzing this fiscal policy and evaluating its potential effectiveness. For that purpose, first a review on different policies which can be implemented to confront the problematic will be presented. After that, fiscal policies and taxes on sugary drinks in particular will be addressed. In this regard, recommendations given by the international health organizations, as well as the experience from other countries who have previously implemented these taxes and the case of the Spanish region of Catalonia will be presented. Next, the current Spanish proposal will be analyzed, to later discuss its approach as well as its potential effectiveness and repercussion on the society in a broader sense. Finally, some recommendations for a betterment of the policy are proposed.

2. OBESITY

According to the World Health Organization (WHO), 39% of adults aged 18 years and over worldwide were overweight in 2016, and 13% were obese. We are talking about more than 1.9 billion people weighting more than it is recommended by health experts, and 650 millions of them having a greater health problem. The prevalence of obesity nearly tripled between 1975 and 2016 with at least 2.8 million people dying each year as a result of being overweight or obese as of 2020 (WHO, n.d.). The evolution of this prevalence as a percentage of each country's total population for the said period can be seen in *figures 1 and 2*. For years, the focus of countries and international organizations has been to fight undernutrition around the globe. However, oddly enough, today most of the world's population live in countries where overweight and obesity kill more people than underweight does (WHO, n.d.). Given the magnitude of the problem in terms of the number of people affected and its global proliferation, obesity has come to be of epidemic proportions - usually referred to as "globesity" -. For that reason, the American Medical Association officially recognized obesity as a disease in 2013 (Pollack, 2013).

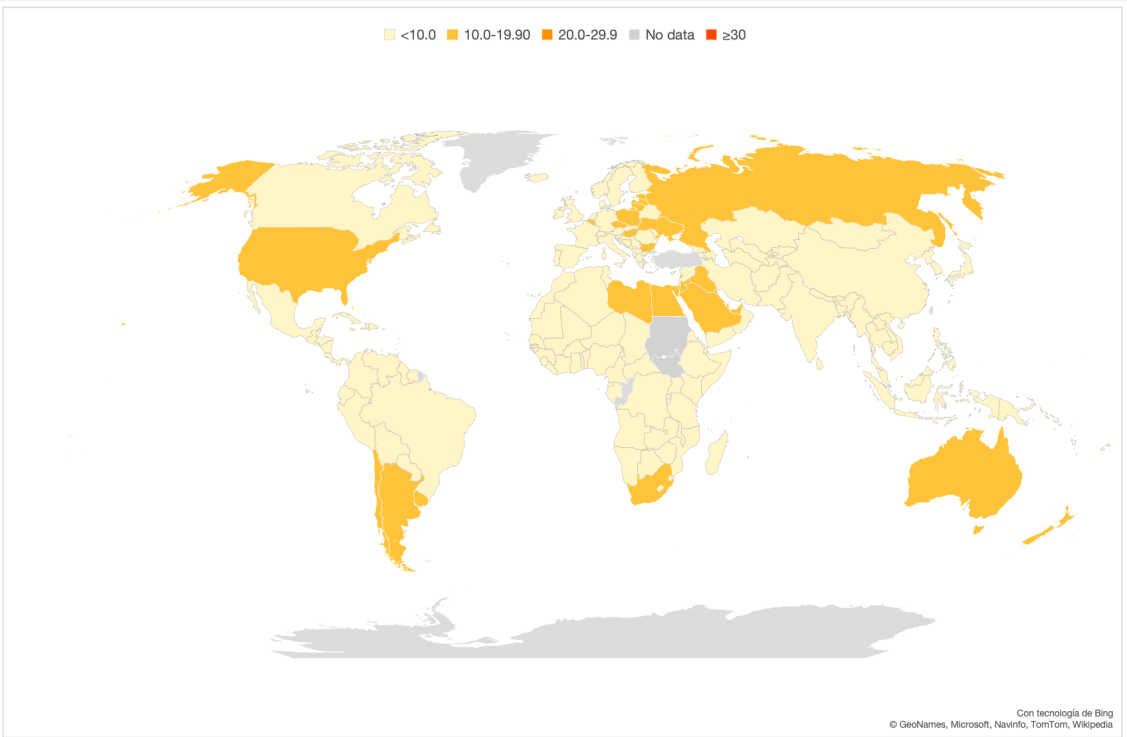

Figure 1. Prevalence of obesity (BMI≥30) among adults by country for the year 1975 (age-standardized estimate) as percentage of total population. Source: WHO. Global Health Observatory.

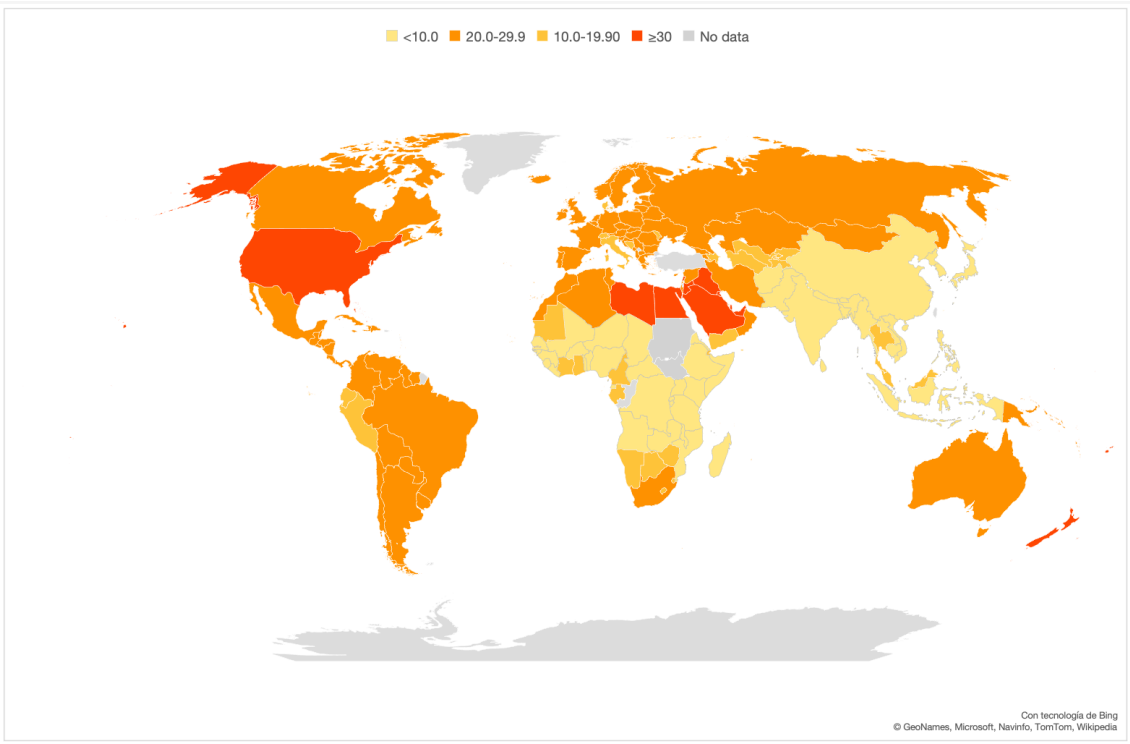

Figure 2. Prevalence of obesity (BMI≥30) among adults by country for the year 2016 (age-standardized estimate) as percentage of total population. Source: WHO. Global Health Observatory.

The terms overweight and obesity are defined by the World Health Organization as abnormal or excessive fat accumulation that presents a risk to health. The prevalent measure to determine, at least in its initial stages, the mentioned health conditions is the Body Mass Index (BMI). The indicator is calculated by dividing a person's body mass (kg) by the square of their body height (meters), and universally expressed in kg/m^2. As it is the same for both sexes and for all ages of adults, and the calculation does not require much time or effort, BMI has become the instrument par excellence in the determination of obesity across the globe. A BMI ≥ 25 is considered overweight and, a BMI ≥ 30, obese (WHO, n.d.).

Following such measure, the Spanish National Health Survey of 2017 showed that more than half of the adults in Spain (54.5%) had an excessive weight: 37.1% were overweight, and 17.4%, obese. In the last 30 years, the prevalence of obesity in people aged 18 years and over has multiplied by 2.4, from 7.4% in 1987 to 17.4% in 2017(Gobierno de España. Ministerio de Sanidad, Consumo y Bienestar Social, 2018). No big differences are found among children, given that the ALADINO 2019 study showed that the prevalence of overweight was 23.3% and the prevalence of obesity, 17.3%, in schoolchildren aged 6 to 9 in Spain, according to WHO growth standards. Within obesity, 4.2% of schoolchildren presented severe obesity (Gobierno de España. Ministerio de Consumo, 2020). This rising

trend of people having an abnormal weight has effects not only on several aspects of the life of the person in question, but also on the society as a whole.

2.1. Causes of obesity

There are issues encircling this condition which combination makes it a much more multifactorial concern, in which the addition of many aspects of life induce its maintenance over time. Environmental factors, family economic background or external stimulants, among others, can influence an individual's health condition and give rise to consequences that can affect a person's life for years.

2.1.1.Factors

The multifactor nature of obesity does not only mean that the condition causes effects in several fields, but also that it is induced at the same time by multiple reasons. Genetic predisposition and environmental influences – which affect our decision-making processes - , are two of the determinants of weight gain. However, the fundamental case of weight gain is an energy imbalance. We need energy to cope with the activities of the day: walk, work, study, process food, maintain our organs active, etc. The way we obtain such energy is through the intake of calories which are present in the food we eat during the day. However, if we consume more calories than we spend, there is an imbalance which later develops into weight gain.

In the last decades, the ways of living have changed acutely. From the industrial revolution which led to more productive, less manual jobs, to the new technologies that have changed even the way we communicate and socialize with each other, our modern culture diverges greatly from that of our predecessors. Even many of our social activities and interactions have moved towards digital environments due to new technologies. Certainly, our daily habits have changed in accordance with our schedules and lifestyle. On the one hand, the increasingly sedentary nature of many forms of work, the new means of transportation, and a growing urbanization, have brought about an increase in physical inactivity. On the other hand, the fact that such urban lifestyle changes our timing patterns – due to shorter lunch breaks or longer commuting time, for instance - give rise to searching for ready-to-eat, energy-dense foods which are high in sugar and fat.

This change in habits is more pertinent among people with a lower socio-economic status, leading to the development of unhealthy lifestyles and underpinning obesity. Corella et al. (2015) reviewed the available studies on the relationship between socio-economic

status, education level and healthy diet and concluded that, indeed, there is an inclination of people among this group towards unhealthier lifestyles for the following reasons. Firstly, eating a healthy diet is more expensive than an unhealthy one. Buying healthier and fresher foods is more costly when it comes to meeting a certain calorie intake than purchasing energy-dense, cheaper food. Hence, from a purely economic perspective, and especially for a family under budget shortage, a way to optimize their monthly grocery shopping would be concentrating their energy needs in a set of energy-dense products. Additionally, accessibility to these healthy options is lower in neighborhoods with lower socio-economic level, increasing therefore their prices even more. It has also been observed in these neighborhoods, that the number of fast-food advertisements and the presence of fast-food restaurants are greater than in neighborhoods with a higher socio-economic level. Finally, the education level of an individual has an impact on their food-related decisions, given that the lack of information on the benefits or harm that certain foods can cause to a person may lead to inadequate decisions.

2.2. Consequences of obesity

The main concern with respect to the present issue is that overweight is among the leading metabolic factors contributing to both the disease burden and the economic burden of Non-Communicable Diseases (NCDs) (WHO, 2021). NCDs, also known as chronic diseases, are those which are not transmissible from person to person. The main types of NCDs are cardiovascular diseases, cancers, chronic respiratory diseases, mental health problems, musculoskeletal problems, and diabetes mellitus. Modifiable behaviors such as physical inactivity and unhealthy diets, which are strongly related to overweight and obesity, increase the risk of developing NCDs. Thus, NCDs are directly and indirectly affected by obesity and its surrounding behaviors. Annually, 41 million people die from NCDs, representing 70% of total deaths globally (WHO, 2021). NCDs are, therefore, the number one cause of death worldwide. Particularly in Spain, NCDs were estimated to account for 91% of all deaths in 2016 (WHO, 2018).

As though enhancing the probabilities of developing a NCD were not controversial enough, the assimilation and normalization of the mentioned new eating, working, and exercising patterns, sometimes magnified as a result of individual and socio-economic factors, perpetuates the quandary of obesity. Not only at the individual level does this have consequences, but the generalization of this lifestyle and subsequent conditions has multiple sectorial repercussions nationwide. For that reason, socio-economic interventions are needed

to avoid what originally could have been considered a purely health-related issue but in reality, leads to large consequences.

First, treatment of obesity and related chronic conditions increases health expenditure, both at the individual level and at the macroeconomic level regarding governments and their national health systems. In 2019, the Organization for Economic Co-operation and Development (OECD) estimated in its report *The Heavy Burden of Obesity* that, on average, overweight is responsible for 70% of all treatment costs for diabetes, 23% of treatment costs for cardiovascular diseases and 9% of treatment costs for cancers (OECD, 2019, p. 22). Hence, taking into account the current trend of obesity rates and obesity's related conditions, the amount spent annually associated with overweight in Spain will account, on average, for 9.71% of total health expenditure over the period 2020 to 2050. As seen in Figure 3, the Spanish expenditure on health will be above G20, EU28, and OECD averages. Which, at the individual level, this could be understood as 226.9 USD PPP per capita per year (160.65€ according to the 2019 PPP[1])

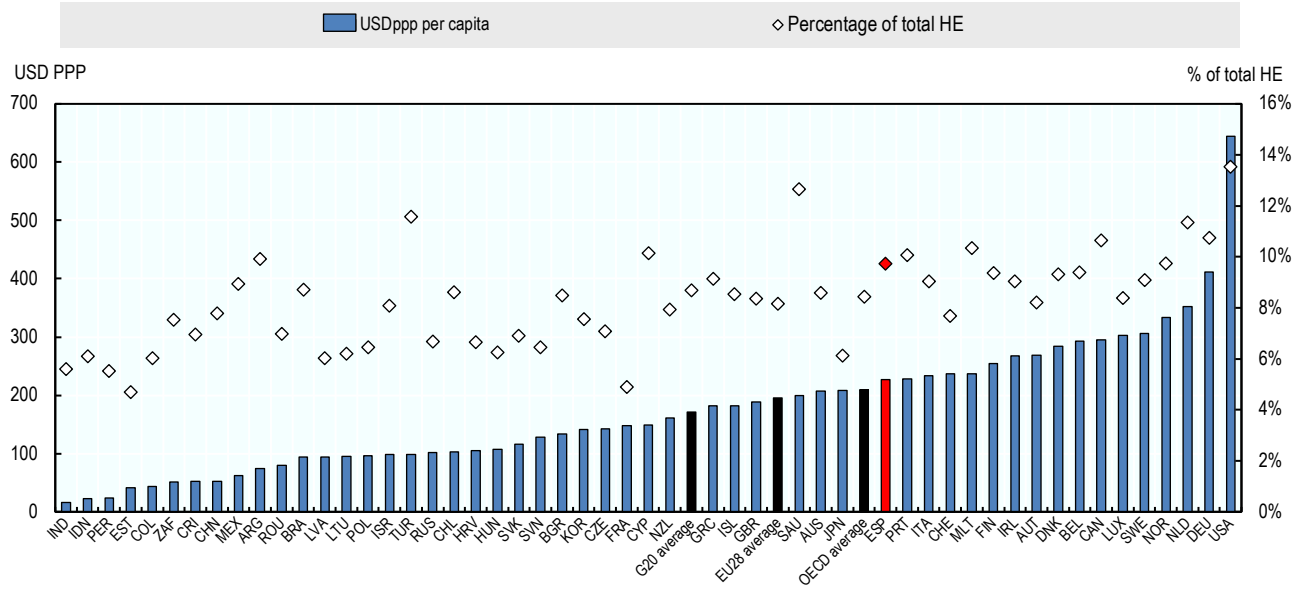

Figure 3. Health expenditure due to overweight per year, in USD PPP per capita and as a percentage of total health expenditure, average 2020-2050. Source: The Heavy Burden of Obesity

[1] Source: Purchasing Power Parity (PPP). OECD Data. Retrieved from https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

Second, overweight is associated with lower academic performance. According to the OECD analysis based on the 2013-2014 Health-Behaviors in School-Based Children survey (HBSC), in Spain, healthy-weight girls aged 11-15 have 8% more chance of performing well at school that the most obese girls (Inchley, J., 2016, as cited in OECD, 2019, p.107). The chances are higher for boys, as they have 13% more chance to report good academic performance. Obesity is also associated with higher risk of absenteeism from school and longer absences (OECD, 2019, p. 24). Suffering from obesity is correlated to mental illnesses like depression or agoraphobic behaviors (Simon et al., 2006), as well as to social issues such as low self-esteem or stigmatization of overweight or obese bodies, which can also induce problems related to the perception of the own personal image. As if that was not a complex enough situation for children, this scenario sets the basis for bullying in schools which, in turn, leads to more intricate mental problems. From the 2013-2014 HBSC survey, the OECD estimated that Spanish most obese boys were 1.8 times more likely to be bullied than healthy-weight boys. Figure 4 shows the relative index of inequality for being bullied by BMI category, by sex and country. In the case of obese girls, they were 2.86 times more likely to be bullied than their healthy-weight peers (OECD, 2019, p. 121), which is still lower than OECD 26 average. In the long run, lower educational attainment resulting from such circumstances negatively affects an individual's socio-economic status in adulthood and the human capital of countries.

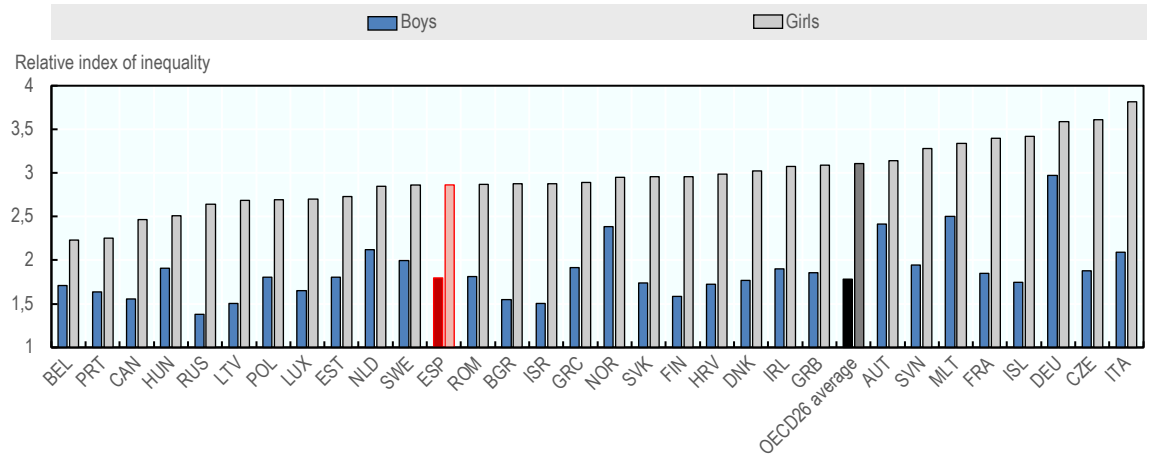

Figure 4. Relative index of inequality for being bullied by BMI category, children aged 11-15, 2013-14, by sex and by country. Source: The Heavy burden of Obesity

Third, obesity and its consequences affect individuals' productivity and workforce participation with a negative impact on labor market outputs. Similar to the school case, people with overweight in the workforce are more likely to miss days of work and to be unemployed (OECD, 2019, p.86). Yet, when they are at work, they are less likely to be productive than healthy individuals. The OECD estimated the impact of overweight on the

labor market for the period 2020-2050, through absenteeism, presenteeism, unemployment and early retirement. In Spain, labor market output per capita will decrease by 0.34% due to overweight related absenteeism and 0.74% due to presenteeism – where employees are present at work but less productive -. Also, given that overweight reduces the likelihood of being employed, Spain will face a decrease of 0.34% in labor market output per capita due to overweight-related unemployment. Additionally, overweight increases the number of employees who retire early, decreasing the Spanish labor market output by 0.07%. Based on average wages, the average impact on per capita labor market output per year for the period 2020-2050 due to absenteeism, presenteeism, employment rate and early retirement in Spain is estimated to be of -674.1 USD PPP (477.26€ according to the 2019 PPP[2]). In Figure 5, we can compare the impact on pec capita labor market output based on average wages, per year, by country, an see the position of Spain in relation to the other OECD countries.

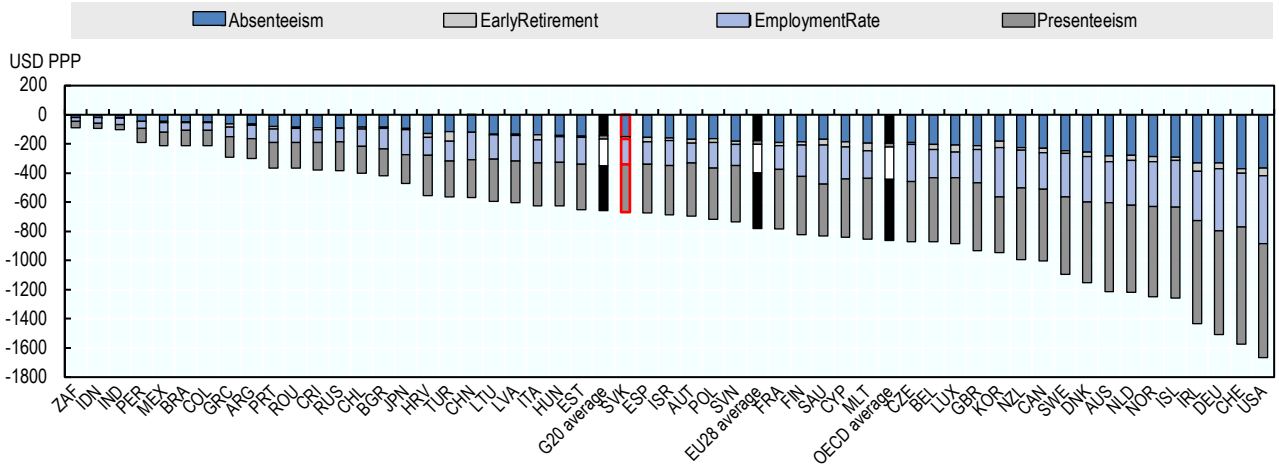

Figure 5. Impact on per capita labour market output based on average wages, per year, in USD PPP, average 2020-2050. Source: The Heavy Burden of Obesity

At the macroeconomic level, the effect that these losses of labor market productivity, life expectancy, and health expenditure can have on a country's GDP may be significant. Over the period 2020 to 2050, the percentage difference in GDP due to overweight in Spain is estimated to be -2.9% (OECD, 2019, p.90).

[2] Source: Purchasing Power Parity (PPP). OECD Data. Retrieved from https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm

3. THE IMPORTANCE OF TACKLING OBESITY

Yet, by solving some of the social and environmental factors mentioned before, or by countering them with new better options, we could achieve a multiplier effect. Changing some of our habits towards healthier ones can largely prevent both overweight and its associated chronic diseases (Hruby and Hu, 2014, as cited in OECD, 2019). Following this conviction, and due to the global scope of the overweight and obesity epidemics, international institutions have increased their efforts into tackling some of their key social and environmental determinants along the years.

To better understand the importance of NCDs, overweight and obesity, as well as to have deeper insights on the future impact that such conditions have not only on the population but on the world's economies, and to review the current preventive interventions that governments are implementing to fight the epidemic, we will make use of The Heavy Burden of Obesity, which has previously been mentioned. This report, undertaken by the OECD and published in October of 2019, is the continuation of a preceding OECD publication on obesity called *Fit not Fat* (2010). The aim of this first study was to "outline an economic approach to the prevention of chronic diseases by examining the scale and characteristics of the obesity epidemic, the respective roles and influence of the market forces and governments, and the impact of intervention". *The Heavy Burden of Obesity* aims at continuing this work through the update of the available data on the issue, the analysis of national and international actions put into place since 2010 to tackle obesity, and the implementation of an advanced microsimulation model linked to the OECD long-term projection model in order to simulate the impact of obesity on 52 countries from 2020 to 2050.

As it can be found in *The Heavy Burden of Obesity*, since the early 2000s, there has been increasing recognition of the importance of overweight-related NCDs as a determinant of sustainable human development, as well as of the need for international co-operation to tackle the burden of NCDs. Action in this field has significantly intensified since 2011, with the first UN High-Level Meeting on NCDs (OECD, 2019, p. 125). Following that meeting and subsequent ones, countries committed to achieving a number of targets and goals. Under the umbrella of the WHO NCD Global Action Plan, in 2013 countries agreed a set of voluntary targets for risk factor reduction by 2025 compared to baseline levels in 2010, in

the framework of the "Global monitoring framework on NCDs"(OECD, 2019, p. 126). Some of the targets were:

- A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.
- Halting the rise in diabetes and obesity
- A 10% relative reduction in prevalence of insufficient physical activity
- A 25% relative reduction in the prevalence of raised blood pressure.

In an endeavor to ensure the achievement such goals, countries have developed national cation plans, sometimes based on the World Health Organization's Global Strategy on Diet, Physical Activity and Health and other global relevant action plans.

4. MEASURES TO TACKLE OBESITY

Multi-sectoral response is needed to target overweight determinants. We would hope that information and education were enough for people to understand the severity of the matter and the proportions that obesity may entail. However, information alone is not efficient in isolation. Putting it into perspective, as much as education programs aiming to influence children's lifestyles is of high importance, it is not sufficient in the context of a community where purchasing fast food is easier and cheaper than purchasing fresh vegetables and fruits. Hence, a wider policy foundation should be designed for greater results.

In line with the OECD framework (Sassi and Hurst, 200, as cited in OECD, 2019), public health policies to tackle overweight and to promote healthier lifestyles can be categorized into the following four broad groups presented in Table 1:

Table 1. Public health policies to tackle overweight and promote healthier lifestyles. Source: own elaboration based on OECD.

PUBLIC HEALTH POLICIES TO TACKLE OVERWEIGHT AND PROMOTE HEALTHIER LIFESTYLES			
Policies influencing lifestyles through information and education	**Policies widening the set of healthy choice options**	**Policies regulating or restricting actions promoting unhealthy choice options**	**Policies modifying the cost of health-related choices**
Food labelling: BoP FoP	School-based and other environmental policies that can influence children	Regulation of advertising	Changes in nutritional community environment through economic incentives
Menu labelling	Workplace policies	Other restrictions	Price policies: Healthy food subsidies Unhealthy food taxes
Mass media campaigns	Policies promoting public transport and walking		
ITC			

The Spanish Ministry of Health and Consumer Affairs drew up the Strategy for Nutrition, Physical Activity and Obesity Prevention (NAOS), which is coordinated by the Spanish Agency of Consumption, Food Security and Nutrition (AECOSAN) in 2005, following the recommendations of the previously mentioned international health institutions on the prevention of obesity, with a special focus on child obesity. The strategy encompasses multiple areas of intervention given the multifactor nature of obesity: family and community, schools, businesses, and the health system. Specific programs are developed for each one of the areas, targeting the segment of concern. In 2011, the NAOS Strategy was consolidated and driven by the Law 17/2011, July 5th, of food security and nutrition (Agencia Española de Seguridad Alimentaria y Nutrición, n.d.).

4.1. Policies influencing lifestyles through information and education

Among policies influencing lifestyles through information and education we find food labelling, menu labelling, mass media campaigns and ITC. Let's briefly explain each of them:

4.1.1.Food labelling

Labelling the pre-packaged foods aims to inform the consumer about the nutritional value of the food being purchased. Normally, such labels can be found in the back of the package – back-of-pack (BoP) – and include a list of ingredients and nutrients. Yet, there are also front-of-pack (FoP) labels which come in an easy-to-understand format, with the aim of warning about nutrients that should be consumed in limitation or avoided altogether - sugar, salt, saturated fats contents, etc. - or highly positive aspects – dietary fiber content -.

In Spain, only BoP labelling is mandatory on packaged, following the EU Regulation 1169/2011 on the "Provision of Food Information to Consumers", and it requires the listing of the energy value, the amounts of fat, saturates, carbohydrates, sugars, protein and salt, expressed "for 100g or 100 ml" (AESAN, 2017)The same regulation permits voluntarily to include FoP labels using "other forms of expression" such as pictograms or symbols, as long as they meet certain requirements.

One of these voluntary FoP labels is Nutriscore. During his appearance in the Health and Consumption Commission of the Senate on June 26th of 2020, the minister of Consumption, Alberto Garzón, announced that the FoP labelling system Nutriscore would come into force during the first quarter of 2021 (AESAN, 2020). This system, first introduced in France in 2018, categorizes food products from A to E and from green to red – A and green corresponding to the products with the "best nutritional quality" and E and red, to those with the "least good nutritional quality - (Chauliac, 2018). A visual representation can be seen in Ilustration 1.

Ilustration 1. Nutri-score FoP labelling. Source: Redacción Médica. https://bit.ly/3xNDW0x

Although the reasoning and intentions behind such system are good and it was carried out by health and nutrition professionals, there are failures in its implementation. The main one is its voluntary establishment. The fact that only those businesses which decide so will

show the label on their packs induces to a poor classification of the products on the supermarket shelfs: only those products that can proudly show an A or a B in green on the Nutriscore scale will choose to have the label, while those aware of their low score (say D or E, in red) will simply not include it on the packaging. This way, consumers will not be sure whether those unlabeled products are unhealthy, or the brand merely wanted to save costs by not printing more designs on the package. The second failure, and the most controversial recently, is that the Nutriscore standards may punish one-ingredient-products – such as olive oil, honey or milk – in favor of ultra-processed, multi-ingredient products, based only on their amounts of calories or fats, disregarding the processing level of the products or their nutritional value. By not assessing the aspects related to the produce of obtaining the product, in the case of fats for instance, extra virgin olive oil obtains the same score (D) as regular olive oil because of their similar lipid profile even though the former one is healthier (Medina, 2020).

4.1.2.Menu Labelling

"Restaurant menu labelling involves listing information on the calorie content, as well as on the content of other nutrients, such as salt and sugar, of items on the menu at point-of-purchase of restaurants and cafeterias" (OECD, 2019, p. 134). In a systematic review and meta-analysis of menu labelling initiatives, Sinclair et al. (2014, as cited in OECD, 2019) found that participants who received menus with labels consumed 41 fewer calories per purchase, compared to the control group, and that the contextual or interpretive design of the labels could be more effective and reduce calory consumption by 81 kcal. Thus, menu labelling is a potentially effective policy to reduce calory intake by consumers. Especially, the focus should be on reducing the intake of calories from the least good nutritional quality products. Also, there is preliminary evidence that mandatory menu labelling, aside from positively influencing consumer behaviors, might as well encourage restaurants to reformulate their menus by offering lower calorie content (Block and Roberto, 2014; Bleich et al., 2015, as cited in OECD, 2019, p. 134))

While calorie-content menu labelling is not mandatory in Spain, all food operators must inform the customers of allergens present in the products served unpackaged in restaurants, cafeterias, etc., as stated in the Real Decree 126/2015 of February the 27th (España, Ministerio de la Presidencia, Relaciones de las Cortes y Memoria Democrática, 2015). The mandatory 14 groups of substances that cause allergies or food intolerances to be indicated in the menus are depicted in Illustration 2. Even though this regulation can be understood

as a mean of food-poisoning prevention, it is not clear that such information might influence consumers towards obesity prevention behaviors.

Ilustration 2. The 14 mandatory groups of substances that cause allergies or food intolerances to be indicated in menus established by the European Regulation n. 1169/2011.

4.1.3.Mass media campaigns

Health promotion can be channeled through mass media: from the traditional media (television, radio, newspapers) to new media platforms (social networks such as social media, online marketing). These kinds of campaigns have the potential to reach a large number of people and can be designed to tackle multiple overweight risk factors at the same time. Additionally, the current digital marketing tools allow institutions to target specific population segments more precisely in order for a campaign to be more efficient in the prevention of obesity – vulnerable groups, particular age groups, etc. -.

A fairly wide range of mass media campaigns have been carried out by Spanish Government and institutions. For instance, in the year 2000, Spain joined the well-known

Ilustration 3. "5 al día" logo. Source: https://www.5aldia.org/

"5-a-day" campaign (which logo can be seen in Illustration 3), existing in more than 40 countries and originated in the USA in 1989, which promotes a minimum daily consumption of 5 helpings a of fresh fruits and vegetables (5 al día, n.d.). Other campaigns promoting reducing the consumption of sugar ("Azúcar, te dejo") or healthy habits and nutrition recommendations for new-borns ("Gracias por esos 1.000 días") have been published on the social media accounts of the Agencia Española de Seguridad Alimentaria y Nutrición (AESAN, 2020; AESAN, 2017).

Companies and organizations often participate in the furtherance of such campaigns. For example, Atresmedia, a Spanish media group present in the television, radio, and cinema industries, has collaborated with the Ministry of Consumption in the promotion of the "Objetivo Bienestar" strategy included in the NAOS national strategy by producing and publicizing campaigns for the promotion of the Mediterranean diet, water consumption, or physical activity (Atresmedia, n.d.). It should be noted, however, that the fact that private companies and organizations can join these movements may have the potential to rise latent conflicts of interests on both sides.

4.1.4.New technologies

The increasingly wide variety of opportunities that new technologies provide us can also be applied to the prevention of NCDs. "In the simplest form, electronic tools can deliver information as text-messages" (Hall et al., 2015, as cited in OECD, 2019, p.136) or operate as more complex E-health behavioral interventions, including, for instance, mobile health apps, computer-assisted personalized feedback, web-based courses and interactions over social media (Hutchesson et al., 2015; Oosterveen et al., 2017, as cited in OECD, 2019, p.136). One example of a health-related app is the mobile app Radar COVID developed in 2020 during the Covid-19 pandemic in collaboration with the Spanish Government with the aim of helping to control the propagation of the virus through the identification of possible close contacts of confirmed positive cases through Bluetooth technology (Gobierno de España, 2021).

Although no official mobile application has been developed to tackle obesity by national institutions, several bodies have launched their own applications to control a person's daily calorie intake, physical activity, or to educate the family in healthy habits. Examples of these are Esporti Family, created by health professionals from the Region of Murcia, or Control de Dietas, by the Center of Investigation of Endocrinology and Clinic Nutrition from

Valladolid (Healthy Blue Bits S.L., 2021). Another mobile application which has been gaining popularity since its launch in October of 2019 is MyRealFood. This app, which was the continuation of the Realfooding movement started by the nutritionist Carlos Ríos, enables the users to scan the barcode of packaged foods and see the classification of the product according to its processing level – "ultraprocessed", "good processed" or "real food" -. (MyRealFood App, S.L., 2020). Figures 4 and 5 depict both apps.

Ilustration 4. Esporti Family logo. Source: https://esportifamily.com/

Ilustration 5. MyRealFood logo. Source:https://myrealfood.app/

4.2. Policies aiming at widening the set oh healthy choice options

The next series of policies are those which aim at widening the set of healthy choice options, among which we can find policies intended to influence children and policies promoting active transport and walking.

4.2.1. School-based and other environmental policies that can influence children

Children are of particular concern in the midst of the obesity epidemic. Given the fact that children have not yet acquired the critical thinking skills needed to exercise self-control when making decisions things in general, and health in particular, they are vulnerable to external influences. Foremost, they will do what their parents tell them to do. In this sense, they will follow their parent's diet and acquire exercise-related habits from them. However, other outside influences affect children's food learning. For instance, as soon as they go to school, their food-related decisions are influenced by the canteen options they find, the food their peers bring for recess, or their teachers' lectures. Also, at the community level, children are exposed to external circumstances that affect their food choices. As mentioned before, a child living in a low socio-economic neighborhood might have less access to fresh fruits and vegetables while, at the same time, are more exposed to fast-food advertisements. Therefore, the health-related behaviors of children can be affected not only through policies which specifically target them (in the school environment), but also through policies targeting a broader set of people (in broader environments, such as communities).

While no mandatory nutritional standards are applied for Spanish schools, a set of recommendations were approved in 2010 by the Spanish Health System's Inter-Territorial Board and published in the Consensus Document on Food in Educational Centers to be implemented in any kind of educational center where food is supplied to the pupil body (AESAN, 2010). In this document, guidance on calorie and nutrients intake, duration of mealtimes, special requirements, etc. are provided for teachers, lunchtime supervisory stuff, families and whoever the matter may concern. Recommendations on the vending machines in educational centers are taken into consideration as well. Given that such information also reaches parents, the recommendations drawn by experts can be applied beyond the children's educational environment.

On the other hand, schools and kindergartens are contemplated under the Law 17/2011, of 5 July on Food Safety and Nutrition with regards to publicity related to food, nutrition and physical activity (Ley 17/2011, 2011). In this way, such educational centers are considered publicity-free zones. The article 40.7 of Law 17/2011, of 5 July states that "Campaigns for the promotion of diet, nutritional education or the promotion of sport or physical activity in schools and the sponsorship of teams and sports events in the academic environment shall be previously authorized by the competent educational authorities, in accordance with the criteria established by the health authorities with the objective of fostering healthy exercise and nutritional habits and preventing obesity." (AECOSAN, 2015)

By addressing both the actual intake of healthy foods and the limitation of publicity of unhealthy products and habits, the action has the potential to be more effective, as children are directly as well as indirectly influenced.

4.2.2. Workplace policies

As working schedules are longer and the workplace becomes the second home for many adults, workplace-based actions are increasingly considered as a potentially effective tool to influence choices favoring healthier lifestyles. Through the well-designed selection of daily menus and snacks provided in workplace cafeterias, or the promotion of physical activity and reduction of sitting time by providing sit-stand workstations, employers can influence, to some degree, their employees' health status. If these policies happen to achieve an improvement in the health of the employees, then a company could gain productivity and have lower rates of absenteeism. As a result, lower absenteeism-related costs and rising productivity gains would enlarge profits. An indirect effect of these types of policies, a review of the Japan's public health system conducted by the OECD in 2019, showed that companies

implementing such programs were generally favorably seen by potential and current employees, which helps to improve their corporate image and to attract and retain talent (OECD, 2019). According to OECD's review of selected studies on the issue, including some meta-analyses, and even though the evidence on the effectiveness of such programs is still limited, there are promising results – at least in relation to short-term outcomes – (OECD, 2019, p.144).

Contemplated among the NAOS Strategy, the Spanish Agency for Food Service and Nutrition announces yearly the NAOS Strategy Awards with the aim of recognizing and specifically identifying the programs and initiatives which promote physical activity and healthy eating habits (AESAN, 2021). One of the seven differentiated fields of recognition is the labor modality, in which businesses presenting projects on initiatives of these kinds in the workplace are considered to be awarded.

4.2.3.Policies promoting active transport and walking

We mentioned that one of the problems leading to overweight that urban societies have nowadays is the increasing inactivity as a result of modern means of transport. Many times, the preferred means of transportation are the car or public transports such as the underground or the urban bus to save commuting time. However, by choosing those options, we overlook healthier options such as walking or cycling, which could reduce our daily inactivity.

In order to make it easier for people to integrate physical activity into their daily lives through active travel and walking, their environment should be designed for it. For instance, cycle lanes and city renting bikes should be accessible and attractive for people to rather use them instead of moving around by car. Also, actions such as urban planning to increase the number of parks, recreational areas and green spaces may encourage the switch from car use to walking (OECD, 2019, p. 145). Finally, the promotion of public transport usage might also induce to an increase in physical activity, given that people have to walk to the nearest station.

In May of 2020, the National Department of Traffic (DGT), in line and consonance with the recommendations from the 3rd Global Ministerial Conference on Road Safety hosted by WHO in Stockholm in February of 2020, launched a campaign promoting the use of bicycles in the cities (Dirección General de Tráfico, 2020). Seizing the situation caused by the Covid-19 pandemic and the new risk that taking the public transportation had become, as well as

promoting a rapid transition towards a more sustainable and greener urban environment, this campaign was intended to persist in the long run.

However, as it is stated in *The Heavy Burden of Obesity,* while these policies have the potential to positively affect the health of many people, their implementation often relies on local administrations, which may have limited incentives or support at a national level. Especially when it comes to making a large investment to implement a new bicycle lane around the city, increase the public transportation transit, or change the urban design for sustainable purposes. Thus, poorer communities may be less likely to have sufficient resources to implement such actions (OECD, 2019, p. 146).

4.3. Policies to regulate or restrict actions promoting unhealthy choice options

The next set of policies are policies to regulate or restrict actions promoting unhealthy choice options, among which we can find:

4.3.1. Regulation of advertising

Adams et al. (2012, as cited in OECD, 2019) states in their work on the effects of exposure to food advertisements on children that food marketing represents a key factor incentivizing the consumption of high-calorie and nutrient-poor foods through persuasive messages. While marketing is already an effective tool to convince people to buy a product or service and, as a consequence, induce higher sales, it can be even more powerful when the target segment are children. Through the introduction of fantasy and adventure themes, fun, popular characters, etc. in the advertisements, children are persuaded to ask their parents for such products, given that they are usually not the ones making the purchase.

We mentioned before that publicity of diet, nutritional education or the promotion of sport or physical activity in schools was regulated in Spain. Yet, there are other environments in which food advertisements are also present, and even more powerful, where regulations are put in place too. Within the framework of the NAOS Strategy, the Ministry of Health, Social Services and Equality in partnership with the AECOSAN signed the PAOS Code (which acronym in Spanish stands for "Code of co-regulation of advertising for food products and beverages directed to children, prevention of obesity and health") in 2005 (2005). The code "is based on the agreement for the self-regulation of the marketing of food and drinks products to minors" and establishes "rules governing the development, creation and dissemination of advertising messages targeting children below the age of 12." The new PAOS Code (2012) introduces improvements in the area of application, as it extends it "area

of applicability extends to cover the online advertising of food and drink products at young people aged under 15."

4.3.2. Other restrictions

Sometimes, specific foods with potentially harmful properties may need to have a separate regulation. This is the case of trans-fats, for example. On April 24th of 2019, the European Commission published the Regulation (EC) No 1925/2006 of the European Parliament and of the Council as regards trans-fat, other than trans-fat naturally occurring in fat of animal origin. Such regulation declared that "the content of trans fat, other than trans-fat naturally occurring in fat of animal origin, in food intended for the final consumer and food intended for supply to retail, shall not exceed 2 grams per 100 grams of fat." (Regulation (EC) N. 1925/2006, 2006). The rule arose as a consequence of the results obtained from the report on trans fats in foods and in the overall diet of the Union population of 2015 (European Comission, 2005), which concluded that "a high intake of trans fats seriously increases the risk of heart disease, more than any other nutrient on a per calorie basis."

4.4. Policies to modify the costs of health-related choice

This last set of policies, fiscal policies, will be the main point of interest of the present work. Fiscal policies are the use of government taxation and spending to influence economic conditions, especially macroeconomic conditions such as employment, inflation, economic growth, equitable wealth redistribution, or aggregate demand for goods or services. In the context of the obesity epidemic, influencing the aggregate demand for certain goods (i.e., foods and beverages) and services (i.e., gym memberships or nutritional advice) plays an important role in the pursuit of a betterment of such problematic situation. Through the appropriate introduction of economic incentives and disincentives, the supply and demand for desirable goods can be induced at the same time that the supply and demand for undesirable goods and services can be dissuaded.

We will see three types of policies which modify the costs of health-related choices: changes in nutritional community environment through economic incentives, healthy food subsidies for health purposes, and price policies.

4.4.1. Changes in nutritional community environment through economic incentives

When studying a community's nutritional environment, both food availability and accessibility must be taken into account. When people have limited access to a variety of healthy and affordable food, they are said to be living in a "food desert" (Paula Dutko et al.,

2012). So, the availability of nutritious food must be accompanied by affordable prices, so that everyone, regardless of their income, has actual access to it. And this is key, because the environment we live in is one of the factors affecting our health. For example, if it is difficult for us to buy healthy options within our surroundings but can easily find several fast-food restaurants and convenience stores, we will most likely end up buying the available alternatives (even though they are less healthy) than bending over backwards to find the healthy ones. In the same way, if there is indeed one alternative in our community to get healthier options, but it is one greengrocer's with very-expensive, ecological vegetables and fruit, the decision will not change much from the first one, given that the alternative is out of our budget. Thus, if the nutritional community environment remains as so, worsening the health of its inhabitants, it can potentially become a public matter. Especially for low-income people.

One of the ways to tackle these problems and try to improve the environment of a community for health-related reasons is through economic incentives. These policies can be designed to target either the individual or, in a broader extent, the bigger economic actors. In this case, the economic incentives go beyond taxation of specific goods or subsidies to the individual consumers and try to influence the behaviors of the population through the change in the environment.

In the context of the overweight and obesity epidemic, the community nutritional environment seems to play an important role. Rundle et al. (2009, as cited in OECD, 2019, p.150) found that access to BMI-healthy food outlets (supermarkets, fruit and vegetable markets, and natural food stores) was associated with lower BMI and lower prevalence of obesity in New York City. Motivated by findings like this one, the Healthy Food Financing initiative was established in 2014 in the United States, which provided financial incentives for healthier food outlets to be located in underserved neighborhoods (Block and Subramanian, 2015, as cited in OECD, 2019, p.150).

While changing the nutritional environment of a community can be potentially positive for the restraining the population's tendency to choose unhealthy alternatives, this is only one of the interlocking pieces in the transformation of our communities towards healthier ones. For instance, health-related services should also be available and accessible in every community and for everyone. On the whole, no community should be a "health-care desert". But other services related to our well-being should be taken into account as well. If the closer gym to someone's house is in the other side of town, they will rather not get a membership than displacing continuously for a gym session. To change that, economic incentives can be

offered to companies which operate in the fitness industry, for instance, to open a facility in underserved areas.

4.4.2. Healthy food subsidies for health purposes

In line with the previous policies, once the availability of healthier options is guaranteed, the system must make sure that the condition of affordability is also met. One way to achieve such target is through subsidies for certain products. A subsidy is defined as "money that is paid by a government or an organization to reduce the costs of services or of producing goods so that their prices can be kept low" (Oxford University, 2021). Given that healthier options are products high in quality, usually fresh and not highly industrialized (which increases costs of production/recollection), their prices are generally higher than those of unhealthy alternatives which, on the contrary, follow an industrialized process and exhibit lower quality. Hence, by subsidizing these former goods, their prices could be more competitive in the market and people could find them economically worth buying.

Together with making the price of a product more competitive, subsidies can be used to reflect the potential health benefits that such products generate. "The traditional economic rationale for fiscal policies targeting foods and beverages depends on whether their prices fully reflect social and economic consequences of their consumption" (OECD, 2010, as cited in OECD 2019, p.148). For instance, the consumption of fruits and vegetables has a positive effect in our health, and consequently lead to lower economic costs in a macroeconomic level (i.e., lower spending in health services). These future savings in health care costs should be included as a "discount" in the price. However, this is not taken into account when setting the prices of the products in the market. As a result, fruits and vegetables, although generating positive economic effects, still have a high price, and their consumption is "socially suboptimal".

Ruopeng An (2013) concluded from his systematic review of field experiments on the effectiveness of monetary subsidies that subsidizing healthier foods tends to be effective in modifying dietary behavior. The purchase and consumption of subsidized products (fruits and vegetables, and low-fat and low-calorie foods) were significantly increased in supermarkets, cafeterias, vending machines, farmers' markets or restaurants. Yet, evidence on the long-term effectiveness, cost-effectiveness at the population level, and the impact on overall diet intake is still lacking.

Other than discounts for the purchase of healthier products, another widespread form of food subsidy are vouchers for healthy meals. An example of this is the program Healthy

Start implemented in the UK, which offers low-income women who are either pregnant or have children under the age of four free vouchers every week to spend on milk, fresh, frozen, and tinned fruit and vegetables, fresh, dried, and tinned legumes, vitamins and infant formula milk (NHS, 2021).

4.4.3. Taxing unhealthy food

Finally, if availability of healthy options is guaranteed and these options are economically affordable, taxes can be introduced to accentuate the distinction between them and less-healthy alternatives.

Following the same rationale for applying subsidies in an attempt to fully reflect the social and economic consequences of the consumption of certain products, taxes are introduced to generate the opposite effect. For instance, energy-dense foods, as mentioned before, are one of the food products which have become the norm in our modern daily life. Its immoderate consumption leads to an increase in calorie intake, which prompts overweight and obesity. This condition potentially incurs in higher costs of medical care and losses in productivity. Yet, these associated costs are not reflected in their prices, leading to a misinterpretation of its actual worth. Hence, due to their relatively low prices, the consumption of such food products might be too high from the social point of view.

A way to address this issue is through taxes on unhealthy foods. This kind of fiscal policy comprise two main attributes. On the one hand, these policies function in the same way as subsidies - with the aim of changing the dietary behaviors of the population by affecting their decision-making process when purchasing food -, but in the opposite direction. Instead of decreasing the prices of certain products, taxes increase them to disincentivize their purchase and consumption. Thus, they can create incentives to reduce dietary risk factors for NCDs. On the other hand, and as a distinctive characteristic from subsidies, taxes generate direct revenues for the government. Subsidies can indeed generate revenues in the form of future savings in health care spending and other costs associated with obesity and NCDs. However, these are more complex to estimate in the present, and are only "collectible" in the future. Revenues generated from taxes on products, on the contrary, are simpler to estimate in the present, and can be earmarked for health promotion. In this way, the proceeds obtained by the government from the tax can be directly assigned to healthy food subsidies, nutritional educational programs, or any other program included in Table 1. This is the reason why price policies in the form of taxes are more commonly

implemented than subsidies. Figure 3 depicts the potentiality of both types of fiscal policies – taxes on unhealthy foods and subsidies for healthy foods – in the prevention of NCDs.

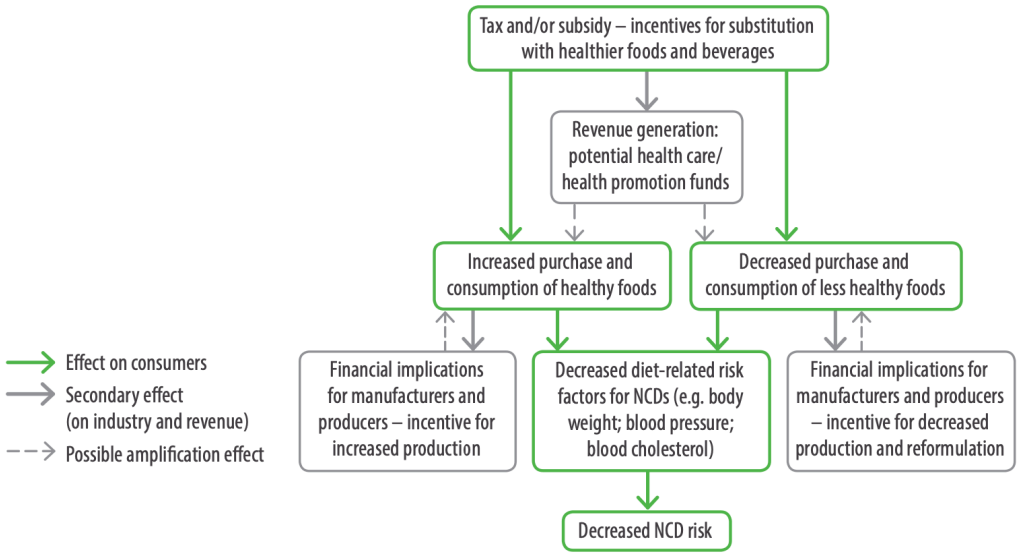

Figure 6. Fiscal policy options with potential for improving diets for the prevention of NCDs. Source: World Health Organization, 2015, Geneva.

Among the food products which are most frequently chosen for the implementation of a tax we can find those that are high in saturated fats, salt, or sugar and, within these last ones, taxation of sugar-sweetened beverages (SSB) is gaining particular attention.

5. SUGAR-SWEETENED BEVERAGES (SSB)

It has been previously stated that the fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories spent, which is the basis for weight gain. We also mentioned that energy-dense foods are becoming the norm nowadays due to the societal transition towards a more productive, busy, and overall modern life. These products contain free sugars -monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates, as defined by the WHO – which, consumed in excessive amounts is considered to be a risk factor for overweight (Bray and Popkin, 2014; Te Morenga, Mallard and Mann, 2012, as cited in OECD, 2019, p.54).

SSBs are a kind of energy-dense food and are characterized by being high in free sugars and calories. However, their peculiarity is that, unlike other energy-dense foods such as hamburgers, pizzas, etc., which provide a certain degree of satiety, there is evidence that humans do not reduce their food intake when adding caloric drinks to their diet (Ebbeling C, et al., 2012, as cited in Ortún et al., 2016). As a consequence, sugary drinks are perceived rather like additional empty calories – those with little nutritional value - instead of substitutive calories. So, it seems faster to reach the energy imbalance when consuming SSBs.

In addition, SSB intake does not only induces a gain in weight, but also appears to increase the risk of diabetes mellitus independently of overweight (Malik et al., 2010, as cited in Gitanjali et al., 2015). Altogether, it was estimated by Singh et al. that, according to the consumption data of 2010, 184,000 annual deaths in the world are attributable to the consumption of SSBs: 133,000 due to diabetes mellitus, 45,000 due to cardiovascular diseases, and 6,450 due to cancer (Singh GM. Et al., 2015, as cited in Ortún et al., 2016). This is the reason why price policies are being applied to these products in an attempt to control an excessive consumption of free sugars as a method to prevent further health issues such as overweight and potential deaths.

5.1. Experience from other countries

13 OECD countries have already implemented some kind of SSB tax (OECD, 2019), from which we can obtain important insights on their experience and the effectiveness of the fiscal measures. The experiences of a few of these countries are presented can be found below.

In 2014, Mexico implemented a 1 peso per liter excise tax on any non-alcoholic beverage with added sugar which is paid by the producer and presents about a 10% increase in price. A study conducted a year after its implementation concluded that "*relative to the counterfactual in 2014, purchases of taxed beverages decreased by an average of 6%. All three economic groups reduced purchases of taxed beverages, but reductions were higher among the households of low socioeconomic status, averaging a 9% decline during 2014, and up to a 17% decrease by December 2014 compared with pre-taxed trends."* (Colchero et al., 2015 as cited in WHO, 2015, p.147)

A tax on non-alcoholic beverages containing added sugar or other sweeteners was implemented in France in 2012, at a set amount of 7.16€ per hectoliter and increased to 7.5€ per hectoliter in 2015. A study conducted in 2018 to analyze its effectiveness concluded that

the tax was fully transmitted to the taxed drinks, and the prices of soft drinks increased between 7.1% and 8.4%. It also estimated a 15% average reduction in quantities of taxed drinks purchased per household, being higher the impact of the tax in households with children (above 16% reduction) and the households which consumed the most SSBs (around 25% reduction) (Capacci, S. et al., 2019).

Berkeley was the first USA city to pass a tax on SSB, imposing a 1 cent per ounce tax on SSBs in 2015. A study conducted to analyze the impact in low-income neighborhoods of the city estimated that prices increased approximately 8% and concluded that the consumption of SSBs decreased by 21% and increased a 4% in comparison cities (Oakland and San Francisco). Water consumption, on the contrary, increased more in Berkeley (+36%) than in comparison cities (+19%) (Falbe, J. et al., 2016).

Chile introduced in 2014 a SSB tax: beverages with a sugar concentration of 6.25 gr per 100 ml were taxed at 18%, while SSBs below this threshold were taxed at 10%. Although the pass-through of the tax was estimated to be approximately of 2-3%, two evaluations found a statistically significant positive effect on monthly purchased volume (Caro et al., 2018; Nakamura et al., 2018; as cited in OECD, 2019, p.148), out of which the OECD estimates a monthly reduction of 43-306 calories per person (OECD, 2019, p.148).

A systematic review and meta-analysis conducted in 2019 by Teng A. et al., concluded that a 10% SSB tax was related to a 10% decline in SSB purchases and dietary intake (OECD, 2019). Thus, these price policies are indeed found to have an intended effect on the consumption of sugary drinks. However, evidence on the long-term effect of these taxes and their impact on health-related outcomes are still based on modelling. For example, OECD and Cecchini and Sassi (2015, as cited in OECD, 2019), have estimated that the savings from such policies are greater when a long-term perspective is taken.

5.2. WHO recommendations based on lessons learned from other countries

From the experiences of the countries which have already put into place price policies of this kind and based on economic theory, international organizations can draw recommendations for other countries who want to implement a similar measure. This is the case of the WHO.

The increasing evidence of the power of economic tools to change people's habits gained importance to the extent that WHO published a report in 2013 called *Global Action Plan for the Prevention and Control of NCDs 2013-2020* in which they proposed that "as appropriate to national

context, countries consider the use of economic tools that are justified by evidence, and may include taxes and subsidies, to improve access to healthy dietary choices and create incentives for behaviours associated with improved health outcomes and discourage the consumption of less healthy options." (WHO, 2013, p. 33) Such was the interest of Member States for implementing these policies in their national plans to palliate the issue of NCDs that, 2 years later, WHO convened a technical meeting of global experts in fiscal policies in Geneva as an answer to the increasing guidance requests. The result of the convention was a report called *Fiscal Policies for Diet and Prevention of Noncommunicable Diseases* (WHO, 2015) This document can be seen as a handbook for countries to design and implement policies of this kind according to the existing evidence, through the provision of fundamental knowledge and recommendations to follow.

Out of the aforementioned "policies to modify the costs of health-related choices", WHO focuses on taxes on sugar-sweetened beverages (SSB), unhealthy nutrients (saturated fats, salt and sugar) and/or unhealthy foods; and subsidies on fruits, vegetables and/or other healthy foods. Since our focus are price policies, we will aim our attention at taxes on SSB specifically.

According to WHO, the basics of price elasticities and of the effects of fiscal policies on diet which should be taken into account prior to the design of a tax include:

- Demand for SSB is generally elastic, with price elasticities around -0.9 to -1.3. The price elasticity of demand is a measurement of the change in consumption of a product in relation to a change in its price. In this sense, the demand of a product is said to be elastic when a small change in its price generates a large change in its consumption. On the contrary, if a change in the price of a product does not generate a change in the consumption, or this change is very small, the demand for this product is said to be inelastic. In numbers, a product's demand is considered elastic when the price elasticity is greater than 1 – which means that a 1% increase (decrease) in the price generates a decrease (increase) greater than 1% in the consumption -. In this case, as the elasticity is calculated around -0.9 and -1.3, we could say that a 1% increase in the price of SSB could generate a decrease in its consumption of 0,9% to 1,3%.

- Price elasticity is higher among low-income consumers, in younger people and people with overweight, which is correlated with income. This means that low-income consumers, younger people and people with overweight are more price-responsive – these people will reduce their consumption of SSB more than other population segments when facing the same price change -.

- High consumers of SSB are also likely to be more price responsive. If a person consumes high amounts of these beverages, even a small price increase can translate into a large share of their monthly income, given the total sum of individual beverages purchased throughout the month.

Considering these fundamentals as well as the insights obtained from other countries which have implemented a tax on SSB, WHO suggested in 2015 the following four key questions to consider when designing a fiscal policy on diet and their respective answers:

5.2.1. What type of tax to apply?

Three types of tax were considered: Specific excise tax, ad valorem excise tax, and ad valorem value-added tax (VAT). The explanation of each one can be found in the following figure.

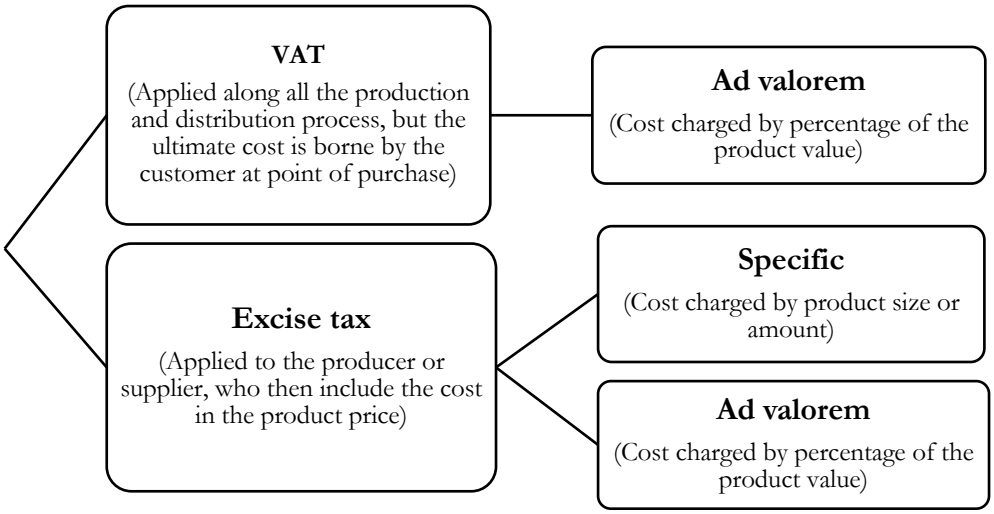

Figure 7. Types of taxes. Source: own elaboration based on Implications for design and implementation of fiscal policies (WHO, 2015).

"Consistent with the evidence on tobacco taxes, specific excise taxes (where a set amount of tax is charged on a given quantity of the product or specific ingredient) are likely to be most effective." (WHO, 2015) The reasoning behind such conclusion is that specific excise taxes reduce incentives to shift to cheaper options – given that they affect all selected products in the same way -, provide more stable revenues – because industry prices cannot be manipulated as it usually happens with products subjected to VAT -, and are easier to administer.

5.2.2. What tax structure to implement?

Once selected the specific excise tax type and in order to generate a greater impact, WHO recommends for countries who have a strong tax administration, like Spain, to implement a tax calculated based on nutrient content (i.e., amount of sugar). This way, not only the tax creates an incentive for consumers to buy products with a lower content of the selected nutrient, but also for producers to reformulate their products (WHO, 2015).

Yet, regardless of the chosen tax structure, the SSB prices would need to be raised by 20%, or more, in order for reaching meaningful health effects. The evidence shows that an increase of 20% or more of the taxed products' prices lead to more than proportional reductions in such products' consumption and net reductions in caloric intake (WHO, 2015).

5.2.3. What product to tax?

The tax base options for beverages range from all or most beverages to all sweetened beverages, only sugar-sweetened beverages (SSBs) or, finally, selected SSBs (WHO, 2015). A country will have to decide which base to set the tax on, according to the responsiveness of consumers to price change for the desired beverages, and the available healthier substitutes of them. The expected fiscal results must be in line with the desirable public health goals.

Together with taxing SSBs, the evidence shows that subsidies for fresh fruits and vegetables (reducing their prices by 10-30%) are effective in increasing their consumption, which improves overall diet quality. Yet, the evidence on the net effect on net caloric intake and weight is still mixed (WHO, 2015). Even so, the recommendation is to integrate both mechanisms – taxes on SSBs and subsidies for fresh fruits and vegetables -, given the growing evidence for the likely effectiveness of their combination, especially as a method to reduce potential substitution effects towards unhealthy products.

5.2.4. What are the implications for revenue generation and diet/nutrition-related programming?

Earmarking the tax revenues can be used to connect the economic side of the policy with the promotion of health. For instance, the authorities could fund education campaigns, healthy food subsidies, or even limit the regressive impact of the tax with the profits generated with the introduction of the tax. *"Earmarking will improve the transparency of the taxation process and use of revenues, which will increase the acceptability of the tax by politicians and the general public."* In particular, the earmarking of tax revenues to subsidies for healthy options is of special interest, given that *"greater effects on the net energy intake and weight may be accomplished by combining subsidies on fruits and vegetables and taxation of target foods"* (WHO, 2015).

Countries must consider the challenges in policy implementation that the food and beverage industries will set. These lobbies will finance the necessary campaigns to pressure both the public and the private sectors in an attempt to avoid the implementation of the policy, as learnt from the tobacco policy experience. For that reason, *"regardless of the pressure and finance form the industry, any opposition to taxation can be overcome with a well-planned campaign*

involving a broad coalition of supporters, the ability to respond to the beverage industry's propaganda, and sufficient resources." (WHO, 2015)

6. THE CASE OF SPAIN

The data on consumption of SSBs and SSB-related health issues in Spain are indicators with enough significance for the government to consider the implementation of a tax on these products.

From the aforementioned study based on the 2010 SSB consumption by Singh et al., we learn that 30 out of one million adult deaths, and 0.6% of all deaths were attributed to SSBs in Spain. According to the household expenditure on SSBs of 2016, Spain was ranked fourth country in the world on consumption of sodas. Spaniards consumed 945 cans of soda per capita during the said year, which added up to 14,471 million liters of SSBs (Perez Verdú, 2016). Thus, it seemed like an interesting opportunity to follow the example of other countries and implement in Spain a tax on SSBs in an attempt to control its consumption.

6.1. The case of Catalonia

Catalonia was the first, and only, region in Spain to ever introduce a specific tax on bottled sugary-sweetened beverages. On May 1st of 2017, a tax on SSB came into force in Catalonia, Spain, after the approval of the Law 5/2017 of 28 March on fiscal, administrative, financial and public sector measures (Ley 5/2017, 2017). The tax was designed and introduced following the recommendations of international organizations and the lessons learned from other countries who had previously introduced these kinds of taxes in order to promote a swift in consumption habits of the Catalonian population towards healthier ones.

According to the law, were understood as sugary-sweetened beverages those containing caloric added sweeteners such as sugar, honey, fructose, saccharose, or syrups such as corn, agave, rice…This included soda drinks, fruit juices and nectars, sport drinks, teas and coffees, energetic drinks, sweetened milks and shakes, vegetal drinks and flavoured waters.

It was designed as a specific tax, as it is levied on the basis of amount of sugar that the beverage contains. Specifically, the tax was stablished at:

- 0.08 euros per litre for beverages with a content of 5 to 8 grams of sugar for every 100 millilitres.
- 0.12 euros per litre for beverages with a content superior to 8 grams of sugar for every 100 millilitres.

An additional, and important, feature of the tax was that the whole increase in price had to be translated to the final consumer (100% pass-through rate to final prices). Because sellers of the products do not want to see a vast drop in the sales, they will have incentives to absorb part of the tax so that the consumer does not perceive a large increase in the price. With a lower increase in the final prices, consumers would not reduce their purchases as much, and thus the impact of the tax would not be as substantial as the policy makers had desired. By setting the requirement of the 100% pass-through rate, sellers have no alternative other than shifting the entire tax to the final price.

As reported in the Catalonian Generality Budget of 2017, the estimated impact of the new tax for the year was of 31 million euros (Generalitat de Catalunya, 2017). However, the net collection at the end of the year was of 22.68 million euros, which represented 73.18% of the expected revenues (Generalitat de Catalunya, 2017). Although at a first glance this imbalance in the income tax could seem like a wrong estimation, it could also be the result of a greater-than-expected response by the population. Consumers decreased their purchases of sugary drinks – and switched to substitute products - more than initially estimated, which in turn resulted in a lower income tax.

6.1.1. Impact of the Catalan tax on SSB's

A study on the impact of the Catalan SSB tax on consumption, conducted by Judit Vall Castelló and Guillem López Casasnovas in 2018, was used by the Tax Agency of Catalonia to justify the application of the fiscal policy (Vall Castelló, J. et al., 2018). It was estimated that, after the entry of the law into force and compared to the previous year, there was a 22% decrease in the consumption of these beverages in comparison with zero/light counterparts. The authors attributed this effect to both the reduction in SSB consumption itself and the increase in zero/light drinks (substitution effect) whose prices remained fixed. The reduction in SSB consumption were estimated to account for 403,200 liters per week, saving 32,256,000 g of sugar for the same time frame. At the individual level, these results would mean a reduction in 107 calories on average per person per week.

The study did not find important differences in consumer's responses for high- and low-income regions. Also, the impact of the tax appeared to be stronger in non-touristic areas. Finally, regions with a higher obesity rate responded strongly to the reduction in SSB as a result of the introduction of the tax. This is explained because, as it was seen, SSB consumption was reduced by 26% compared to zero/light beverages for big recipients (more than 0.5 liters), while the reduction in consumption was of 16% for small recipients (0.5 liters

or less). This finding is consistent with the different price change suffered by the types of recipients: because prices of big recipients are proportionally lower than those of small recipients but contain the same amount of grams of sugar per liter, the former ones experienced increases in price of more than 20%, while the latter ones, of 5-10%. As stated by the authors, "this is an important finding as it implies that those individuals that consume more SSB (as they buy it in large recipients) are also the ones that are strongly reducing their consumption of SSB in response to the introduction of the tax."

Even though data on health outcomes was not contemplated in the study, Vall et al. (2018) suggest that this stronger impact in areas with a higher incidence of obesity pointed towards potential long-term positive effect on health outcomes of the introduction of the tax.

6.1.2. Catalan tax update

In June of 2020, the Law 5/2020 of 29 April was published in the Official State Gazette (BOE), which modified the previous Law 5/2017 in relation with the SSB tax in Cataluña (Ley 5/2020, 2020). By means of the new law, the previously established tax rates were increased by 25%, resulting in:

- 0.10 euros per litre for beverages with a content of 5 to 8 grams of sugar for every 100 millilitres.
- 0.15 euros per litre for beverages with a content superior to 8 grams of sugar for every 100 millilitres.

As stated in the BOE, such modification was introduced with the aim of stimulating a swift in the behaviour of both the producers (by reducing the amount of sugar in the commercialized beverages) and the consumers (by opting in favour of healthier beverages).

This time, the estimations for the monetary impact of the tax increase on the Catalonian Budget of 2020 were higher than in the previous occasion: 32.62 million euros (5.27% higher than in 2017) (Generalitat de Catalunya, 2021). Still, the final collection of the tax did not reach the estimations and resulted in a net revenue of 29.11 million euros. Yet, such tax income represented 89.28% of the initial estimation, which is higher than the results obtained in 2017. The results appear to be comparable given the fact that the two tax implementations came into force in similar months (May/June).

6.2. Spanish proposal at the national level

Almost 4 years after the implementation of the SSB tax in Catalonia and given the unceasing advancement of the overweight and obesity epidemics, the Spanish Government decided to launch a nation-wide fiscal action.

The Spanish General State Budget Law for the tax year of 2021 approved by the cabinet on October 27th of 2020 includes a modification in the application of VAT to sugar sweetened and edulcorated beverages (La Moncloa, 2020). Until 2020, the attributable tax rate for these goods was 10% nationwide – excluding the particularity of Catalonia –. Yet, with the aim of "on the one hand, internalizing the negative externalities generated by the consumption of such beverages, favoring healthier habits of the population and, on the other hand, following the recommendations of numerous international bodies which recommend Spain to limit the application of reduced VAT rates", the government will increase it to the general rate stipulated at 21%. Nonetheless, such increment will only come into effect at the household level, remaining the applicable VAT for these beverages extra-domestically unchanged.

Therefore, after the entry into force of this law, beverages containing added sweeteners, natural and artificial, and/or sweetener additives, except infant formulas and beverages considered food supplements for special dietary needs, are excluded from the reduced VAT rate considerations and cease to generate fiscal benefits (Ley 11/2020, 2020). This measure concerns mainly refreshing drinks, juices and sodas which contain added sugars or sweeteners.

According to the forecasts indicated in the Spanish General State Budget Project, the expected financial impact of the increasing rate is of 400 million euros for the periods 2021 and 2022, distributed as 340 million euros in 2021 and the rest in 2022 (Ministerio de Hacienda, 2020).

Nonetheless, no further specifications on the calculation methods used for estimating such impact are included. Hence, a clarification on the methodology was asked to the Spanish Tax Agency.

The personal email reply by the Spanish Tax Agency to my request for information (February 16th of 2021) says that the estimations were based on the 2018 Encuesta de Presupuestos Familiares (EPF, household budget survey in English) from the Instituto Nacional de Estadística (INE, national institute of statistics in English), which measures

family consumption with a high degree of disaggregation. In particular, the goods included in the estimation were:

- 01.2.2.2 Refreshing beverages with or without gas
- 01.2.2.3 Energetic beverages
- 01.2.2.4 Isotonic beverages
- 01.2.2.5 Fruit and/or vegetable juices

And three important aspects which need to be taken into account for the estimation were:

- The figures from the EPF are market prices and, thus, VAT is already included.
- The figures from the EPF are national and, thus, the amounts corresponding to areas in which VAT does not operate must be eliminated.
- Given that the last figure always corresponds to previous periods to that in which the change in rates will occur, future expenditure needs to be projected.

The indications received from the Spanish Tax Agency for the calculation do not seem to be sophisticated enough for a proper econometric analysis. Not being able to obtain further information, an analysis of the price elasticity of demand and other parameters cannot be performed.

7. DISCUSSION

This final part of the paper discusses the approach of the proposed Spanish rate, as well as its potential effectiveness and repercussion on the society in a broader sense.

7.1. Discussion 1. Is this tax well designed?

It has been previously stated that WHO recommends, based on evidence, that the prices of the taxed products should be increased at least 20% for more effective results. The Spanish tax does not follow this proposal. An increase in the VAT from 10% to 21% represents a price variation (increase) of 10%. Such small increment in the final prices is not significant enough for domestic consumers to perceive a substantial difference, especially regarding products which have low prices such as these kinds of beverages. Hence, the demand for SSBs will not be influenced as much as it potentially could having the prices of the products been increased by 20% or more. In this way, the Spanish tax is failing to reach the full potential that these price policies can have.

As for the type of tax chosen, the Spanish price policy is also disregarding WHO's recommendations. While WHO suggests that the better results take place when applying a specific excise tax, the Spanish Ministry of Consumption opts for an ad valorem tax. The latter one increases all beverages' prices in the same percentage (in the latest Spanish proposal, a 10% increase). Thus, the smaller formats of a SSB will be favored against their bigger counterparts, because their relative increase in monetary terms will be lower. Consumers will perceive a lower final increase in the smaller formats, choosing them before bigger ones. While this shift from bigger recipients to smaller ones could potentially reduce the calorie intake of the consumers, the fact that both formats contain the same amount of sugar per 100 ml is being ignored.

On top of that, not only smaller formats are favored, but also SSBs with higher contents of sugar are. While specific excise taxes are based on the amount of sugar per x amount of liquid, ad valorem taxes are applied equally to all beverages based on the product's value. As a consequence, beverages containing 1gr of sugar per 100 ml will be affected by the tax in the same manner that those containing 8gr of sugar per 100 ml. To the consumers, an ad valorem tax is sending the message that all beverages involved are equally unhealthy, regardless of their ingredients.

As a consequence, producers do not perceive an incentive to reformulate their products in order to offer a lower amount of sugar per x amount of liquid because, regardless of the amount of sugar these contain, their products will be taxed in the same way. Only the total elimination of sugar from their products would exempt them from the tax.

Per contra, there is a fairly positive aspect which should be emphasized from the characteristics of the Spanish tax, which is the incorporation of edulcorated beverages to the products affected. It has been previously stated that the challenge this kind of price policy faces is the substitution effect. When a government implements a tax on SSBs, consumers switch from sugary drinks to zero/light alternatives (as seen, for instance, in the Catalan case's results). However, evidence shows that edulcorated beverages can activate compensatory mechanisms, inhibiting our natural sense of satiety, and hence causing a greater daily calorie intake (Mattes, R.D. et al., 2009 as cited in Ríos, 2019, p. 149). Thus, if we substitute a regular soda with a zero/light alternative, even though the latter one does not contain calories, would most probably incite us to complement it with a snack (which will increase our calorie intake) in order to satiate the hunger that the soda is actually generating.

In this way, by including these alternatives among the taxable products, consumers would not perceive them as more affordable substitutes to the regular SSBs, and thus the Spanish government could diminish the effect. Nonetheless, both sugar-sweetened and edulcorated beverages can be often used rather as a form of recreation than a tool to quench our thirst. Hence, in some situations, a substitute to these products would not be so much a bottle of water, which quenches someone's thirst, as it could be a snack (such as a bag of chips, pastries, or others) which offers that "entertainment" or social moment. Bearing this fact in mind, we ought to determine our goal: 1) reducing the consumption of SSBs assuming a substitution effect towards edulcorated alternatives (zero/light), which do not have calories but do have other substances which might not be desirable or induce consumers to accompany the beverage with a caloric snack; or 2) not giving consumers other alternative than water within the category of beverages, at the expense of at least a small minority deciding to substitute the taxed drinks for solid (and sometimes less healthy) snacks.

7.2. Discussion 2. Is this tax economically beneficial on a social level?

This type of tax, according to the experiences of other countries and of Catalonia in the Spanish case, may have potential to reduce the consumption of SSBs. Further, with a more economical perspective, this is the only policy out of the previously described ones which generates direct revenues to the government, which can be earmarked for programs and campaigns designed for the promotion of healthy lifestyles, nutritional education, physical exercise, etc.

However, evidence of the impact of such decrease of consumption on the bodyweight and overall health of the population is still lacking, given that:

- Taxing certain products, although generates a decrease in their consumption, does not guarantee a substitution effect towards healthier options.
- The implementation of such policy in other countries is still recent, so we are not able to properly analyze its impact in the long-term.

This is the argument which the beverage sector upholds to fight against its implementation. If only potential effectiveness can be proven, why should an attempt be made to tear down an industry as important as that of beverages, which indirectly affects other sectors such as agriculture, transport, distribution, restaurants, etc.?

The professional service company PricewaterhouseCoopers (PwC) carried out a study on the effectiveness and impact on the Spanish economy of a tax on SSBs. Not only the

fiscal impact was taken into account, but also its potential effect on the national employment, on the national Gross Value Added, on the rural areas, etc. However, the report is not available to the public (although the results were presented in Madrid on the 20th of October of 2020), and therefore a copy was requested to several petitioner organizations. The Association of Manufacturers and Distributors (AECOC, for its acronym in Spanish) the responded to my request.

The impact of a new tax, as calculated by PwC, was based on three different scenarios assumed before the Spanish proposal was published. The scenarios were:

- Scenario A: an increase in the VAT rate from 10% to 21% for determined categories of products (food and beverage).
    - Scenario A.1: category E of the Nutriscore system.
    - Scenario A.2: categories E and D of the Nutriscore system.
- Scenario B: Implementation of a new special tax on the sugar, salt, and saturated fats content of products (food and beverage). For the sugar content, the parameters implemented in the first Catalan proposal were assumed (0.08€/g for products with a sugar content between 5g and 8g per 100 ml, and 0.12€/g for products with a sugar content greater than 8g per 100 ml). The parameters implemented for salt content where the ones applied in Portugal: 0.08€/g for products with a content of 1g of salt or more per 100 g. Finally, the tax on saturated fats was assumed to be 0.05€/g for products with saturated fats content greater than 2.3g per 100g, following the Danish tax implemented in 2011.
- Scenario C: total elimination of the reduced VAT rate (with exception of the reduced rate of 4% applied to first need products). In this case, all products taxed at a reduced VAT rate of 10% would now be taxed a 21% VAT rate.

PwC estimates that the losses on turnover would range between 119M€ and 1,125M€ in the worst-case scenario. The Gross Value-Added could experience a drop of 110-1,046M€. From the point of view of the employment, 1,980 to 18,753 jobs could be lost due to the implementation of a tax of this kind. Included in those numbers is the impact on the rural areas – a topic of great interest nowadays due to the rural depopulation -. The study indicates that the impact on the agricultural production of sugar and its related industries could be accounted as Gross Value-Added losses of 14-130M€ and job losses of 360 to 3,400. It should be noted, however, that not only the beverage sector was taken into account for the

estimations but the food sector as well. Thus, had the impact been calculated solely on the beverage sector, the numbers presented would be noticeably lower.

While PwC estimates that the value chain of the food industry (encompassing both the food and beverage sectors) represented 9.9% of the 2016 Spanish GDP, the Association of Refreshing Beverages published in 2014 a report in which it was stated that the sodas sector[3] itself – the industry under study along these pages -, accounted for 1.4% of the Spanish GDP (Puxeu, 2015). The same report shows that the job positions directly and indirectly affected by the category account for a total of 64,000 positions (far from the 3.6 million job positions accounted in the food industry as a whole by PwC).

In relation to the labor market as well, a study conducted in 2014 in California and Illinois (USA) confirmed that SSB taxes are likely to lead to a net increase in jobs, in spite of a small decrease in jobs in the beverage sector. This is because consumers redirect their purchases towards untaxed products, thus stimulating growth in other non-beverage sectors. The study also concluded that regional job losses were overstated and could mislead lawmakers and constituents (Powell et al., 2014).

Notwithstanding, the population's health in general, and the issue of obesity in particular, goes beyond these three measures. What should be pursued is the development of a global and effective enough strategy which is able to tackle obesity by encompassing the multiple factors involved in the issue. If such goal is achieved, we could look at the data on health care cost savings, labor productivity gains, better academic performance, etc. resulted from maintaining a healthier population estimated by the OECD. Hence, would the savings in health care costs and improvements in productivity offset the monetary and job losses from the beverage sector?

The OECD estimates that, if overweight and obesity continue showing the actual tendency, the resources associated to overweight-related health issues will account, on average, for 9.71% of the Spanish total health expenditure per year (OECD, 2019). To have an idea of how much that is, the Spanish health expenditure in 2019 (latest year previous to the COVID-19 outbreak in which health expenditure skyrocketed), amounted for 75,025

[3] While refreshing beverages with or without gas (01.2.2.2), energetic beverages (01.2.2.3) and isotonic beverages (01.2.2.4) are included, fruit and/or vegetable juices (01.2.2.5) are not.

million euros, which represented 6% of the total Spanish GDP (Blas, 2021). 9.71% of it sums up to 7.284.927.500,00 €.

To this amount, we should add the economic consequences of a lower life expectancy caused by overweight (-2.6 years, estimated as the average for the period 2020-2050) as well as the economic impact on the labor market (absenteeism, presenteeism, employment, and early retirement). Taking all these measures into account, the OECD SPHeP-NCDs model estimates that the percentage difference in GDP due to overweight, as an average for the period 2020-2050, would be -2.9%. This means that the Spanish GDP would be 2.9% lower each year due to the impact of overweight. Again, to have an approach to the effect of the issue, we apply the estimations for the period 2020-2050 to the national accounts of 2019. The Spanish GDP of this year added up to 1,245,331 million euros (INE, 2020). Had the country not faced the consequences of overweight, the 2019 GDP could had been 36,114.69 million € higher (a total of 1.281.445.599.000,00 €).

These figures, although being rough approximations, indicate the enormous savings that the Spanish government could achieve by eliminating (in the best scenario) or reducing overweight and obesity.

8. RECOMMENDATIONS FOR IMPROVEMENT AND OTHER MATTERS TO CONSIDER

As a brief summary of the possible improvements for the studied policy to reach its full potentiality, the following measures are proposed:

- Follow the recommendation of WHO and make the tax a specific excise tax instead of the actual proposal of a VAT increment. This way, beverages with a greater sugar content would be more penalized, which would make the measure both: 1) send a more constructive message to the consumers, and 2) generate an incentive for producers to reformulate their products
- Implement the tax gradually. Instead of taxing both sugar-sweetened and edulcorated beverages from the beginning, first tax sugar-sweetened beverages and, at a subsequent time, add edulcorated beverages to the list of taxable products. This way, both consumers and producers have some time for adjusting their consumption (and sweet tolerance) in the case of consumers as well as their production (or reformulation of products) in the case of producers.

- Supplement the tax on SSBs with subsidies to fresh fruits and vegetables, in order to try to capture as much of the substitution effect as possible. Therefore, part of this effect could be prevented from being directed towards other unhealthy options such as ultra-processed foods.
- Earmark the revenues generated from the tax collection for fruits and vegetable subsidies or for other programs in line with the fight against obesity, such as the ones included in the NAOS Strategy.

However, there are a couple of matters that should be also taken into account for a truly rigorous comparison between losses and savings. On the one hand, a specific analysis on the real impact of all the measures implemented by the government to fight obesity (taxes, subsidies, advertisement regulations, media campaigns promoting or disapproving certain products, etc.) on all the sectors affected (beverage, food, diet industry…) should be done. This way, we could compare the potential savings from minimizing obesity with the losses in all industries.

Furthermore, according to the Institute for Health Metrics and Evaluation (IHME), Spain is predicted to have the longest life expectancy in the world by 2040, with an average lifespan of 85.8 years (Prof Stein Emil Vollset et al., 2020). A complete eradication of obesity would result in a healthier and even more long-lived population. Though from the social point of view this is a sign of progress, from the economical side it implies an increase in the pension spending, health-care costs to treat geriatric diseases, etc.

Finally, according to the same study, much of the reason for such a long life-expectancy is the Spanish diet. This was also one of the causes for which Spain was ranked number one in the Bloomberg's Global Health Index For 2019 (Lu, 2019) . Thus, while obesity in general and the consumption of SSB's in particular are problems of international public concern, there is further scope for the Spanish Government to take its necessary time and plan an effective global strategy to tackle overweight and obesity. There is no need to rush the design of a policy.

As a personal observation, developing a global strategy to tackle obesity is worth the effort. From the economic point of view, the return on investment is substantial enough from both the macroeconomic and, most importantly, the social side. The especial focus should be put on the younger generations, so that we are able to prevent obesity instead of fighting an uphill battle once the issue becomes much more difficult to be reversed. The NAOS Strategy is on the right path to promote a healthier lifestyle, especially for children.

However, there is still scope for making some of the current voluntary or self-regulated measures legally enforceable. Ultimately, with regards to fiscal policies, on the one hand the current tax on SSBs should be revised and perfected, and on the other, subsidies to healthy options should be implemented as a complementary fiscal measure to boost the overall effectiveness.

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